



APPELLANTS' BRIEF ON APPEAL

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:)	
)	
Xiao-Chun Mu et al.)	Examiner: DiLinh Nguyen
)	
Serial No.: 09/733289)	Group Art Unit: 2814
)	
Filed: December 08, 2000)	Docket: 884.798US1
)	
For: Microelectronic Package)	
Having an Integrated Heat		
Sink and Build-Up Layers		
Assignee: Intel Corporation		

APPELLANTS' BRIEF ON APPEAL

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Appellant herein submits a Brief in triplicate in accordance with the provisions of 37 CFR §1.192 within a five (5) month period from the filing date of the Notice of Appeal submitted January 22, 2004, and with the requisite fee under 37 CFR §1.17(c) on filing a Brief in support of the Appeal.

The following items are provided with the headings and in the order as required by 37 CFR §1.192(c).

1. REAL PARTY IN INTEREST

In accordance with 37 CFR §1.192(c)(1) requiring identification of the real party of interest in the application, the real party of entire right, title and interest is INTEL CORPORATION, a Delaware corporation doing business at 2200 Mission College Blvd., Santa Clara, CA.

2. RELATED APPEALS AND INTERFERENCES

In accordance with 37 CFR §1.192(c)(2) requiring identification of all other appeals and interferences which would have any bearing on the Board's Decision in the present Appeal, to the best knowledge of Appellant, there have not been and are not any other Appeals, and no Interferences, based on the subject application.

3. STATUS OF THE CLAIMS

In accordance with 37 CFR §1.192(c)(3) requiring a statement of the status of all claims, pending and cancelled, Appellant submits the following:

Claims 1-4, 10-17, and 29 are now pending in this application.

Claims 1-4, 10-17 and 29 stand finally rejected under 35 USC §103.

Claims 1-4, 10-17 and 29 have been rejected and/or have been given a final rejection, and accordingly, the jurisdictional prerequisite under 37 CFR §1.191 for Appeal from the Decision of the Examiner to the Board of Patent Appeals and Interferences has been met. In view of the requirements under 37 CFR §1.191 that an Appeal in an application or reexamination preceding identify, when the Appeal is taken, all rejected claim or claims which are to be appealed and proposed to be contested, Appellant respectfully submits that all presently rejected claims (Claims 1-4, 10-17 and 29) are appealed.

4. STATUS OF AMENDMENTS

The following is a statement of the status of any Amendments filed subsequent to final rejection (as required by 37 CFR §1.192(c)(4)).

No amendments were filed subsequent to final rejection.

5. SUMMARY OF THE INVENTION

A concise explanation of the claimed embodiments defined in the claims in the Appeal, which refers to the specification by page and line number and to the drawings by reference characters (as required by 37 CFR §1.192(c)(5)), is detailed as follows.

A claimed embodiment includes a package. Reference can be made to FIGs. 1-23 and to independent claim 1 for illustration of a summarized embodiment.

The package includes a heat sink (102); at least one microelectronic die (106) having an active surface (124) and a back surface (110), said at least one microelectronic die back surface (110) adjacent to said heat sink(102); a patterned thermally conductive adhesive layer (104) disposed between said at least one microelectronic die (106) and said heat sink (102); and an encapsulation material (108) disposed on said heat sink (102) and said microelectronic die active surface (124).

6. ISSUES PRESENTED FOR REVIEW

In accordance with 37 CFR §1.192(d)(6), the following is a concise statement of the issues presented for review.

(1) ISSUE: Whether the Patent Examiner Erred in Rejecting the Pending Claims under 35 USC §103 Where a Prima Facie Case of Obviousness was not Established.

7. GROUPING OF CLAIMS

It is understood from 37 CFR §1.192(c)(7) that, for each ground of rejection which Appellant contests and which applies to more than one claim, it will be presumed that the rejected claims stand or fall together unless a statement is included that the rejected claims do not stand or fall together. Appellant asserts that the claims stand or fall together.

8. ARGUMENT

The contentions of Appellant with respect to the issue presented for review in the foregoing Item 6 and the basis therefor, with citations of the authorities, statutes, and parts of the record relied on, (as required by 37 CFR §1.192(c)(8)), are provided as follows, with each issue being treated under a separate heading.

For each rejection under 35 USC § 103, Appellant's argument specifies (as required by 37 CFR 1.192(c)(8)(iv)) the errors in the rejection and why the rejected claims are patentable under 35 USC §103, including any specific limitations in the rejected claims which are not described in the prior art relied upon in the rejection.

All descriptions of Appellant's disclosed and claimed embodiments, and all descriptions and rebuttal arguments regarding the applied references, as previously submitted by Appellant in any form, are repeated and incorporated herein by reference. Further, all Office Action statements regarding the objections and rejections are respectfully traversed. Further, Appellant submits the following.

A) The Applicable Law

"A patent may not be obtained...if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art." 35 U.S.C. § 103(a).

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (M.P.E.P. § 2143 8th Ed. Rev. 1).

A determination of the obviousness or nonobviousness of claimed subject matter is a legal conclusion based on several factual inquiries. These include determining the scope and content of the prior art, ascertaining the differences between the prior art and the claims at issue, and resolving the level of ordinary skill in the pertinent art. *Graham v. John Deere Co.*, 148 USPQ 459, 467 (1966); *Winner International Royalty Corp. v. Wang*, 53 USPQ2d 1580, 1586 (Fed. Cir. 2000).

In ascertaining the differences between the prior art and the claims, courts are required to consider the claimed invention as a whole. *Panduit Corp. v. Dennison Mfg. Co.*, 1 USPQ2d 1593, 1597 (Fed. Cir. 1987). It is impermissible to use the claimed invention as a "template" to piece together the teachings of the prior art to render the claimed invention obvious. *In re Fritch*, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992). The claims must be interpreted in light of the specification, claim language, other claims, and prosecution history. *Panduit*, 1 USPQ2d at 1597. A §103 reference must also be considered in its entirety, "including portions that would lead away from the invention." *Id.* A court must consider not only the similarities, but also the "critical differences between the claimed invention and the prior art." *In re Bond*, 15 USPQ2d 1566, 1568 (Fed. Cir. 1990).

In establishing obviousness, two or more references each containing elements of the claimed invention may be combined, provided all the recited claim elements are met and that there is a suggestion, teaching or motivation to combine the references. *In re Dembiczak*, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999). Further, even if the prior art provides such a suggestion, motivation or teaching, there must be a reasonable expectation of success for the suggested combination. *In re Vaeck*, 20 USPQ2d 1438, 1442 (Fed. Cir. 1991).

Finally, it is well settled that mere lawyer's arguments and conclusory statements, which are unsupported by factual evidence, are entitled to little probative value. *In re Geisler*, 43 USPQ2d 1362, 1365 (Fed. Cir. 1997); *In re De Blauwe*, 222 USPQ 191, 196 (Fed. Cir. 1984); *In re Wood*, 199 USPQ 137, 140 (CCPA 1978); *In re Lindner*, 173 USPQ 356, 358 (CCPA 1972).

B) ARGUMENT: Claims 1-4, 10-17, and 29 are Patentable over the Cited References under 35 USC §103 Because the Examiner has not Established a Prima Facie Case of Obviousness.

Appellant refers to the Office Action mailed on January 1, 2003 as the "Office Action". Appellant refers to the Final Office Action mailed on July 22, 2003 as the "Final Office Action".

The specific limitations in the rejected claims are not described in the cited references relied on in the rejections.

Claim 1 was rejected under 35 USC § 103(a) as being unpatentable over Chen et al. (U.S. Patent No. 6,160,311) in view of Jimarez et al. (U.S. Patent No. 6,407,334).

The Office Action admits that "Chen et al. fail to disclose the patterned adhesive layer 33 is a patterned thermally conductive adhesive." (Office Action at page 2).

Regarding the first criterion for establishing a prima facie case of obviousness, there is no teaching or suggestion in either Chen or Jimarez to combine reference teachings. Chen relates to packaging a wire-bond chip 31 to a substrate 34, which acts as an interposer of sorts, to make

electrical contact with a metal-ball 37. Jimarez relates to assuring electrical grounding within a package by coupling a chip 34 to a large body of electrically conductive adhesive 40. There is no teaching or suggestion in Chen to look to Jimarez to find a patterned adhesive 44 in Jimarez. Jimarez also fails to teach an encapsulation material that is disposed both on the die active surface and the heat sink, as required in claim 1. The structure of Jimarez is significantly different from what is claimed, and its incidental occurrence of an adhesive 44 is neither taught or suggested in Chen.

Regarding the second criterion, there is no expectation of success to achieve the enhanced heat dissipating of Chen, or the electrical grounding of Jimarez by their combination. This is because of their disparate endeavors in the technologies they teach. That Jimarez may have a patterned adhesive 44 can only be combined with the teachings of Chen by using the Appellant's disclosure as a guide.

Regarding the third criterion, merely that the Office Action assembles a mosaic of elements to assert a rejection, does not mean all the claims limitations are taught within the standard of unobviousness. The standard of patentability requires "the subject matter as a whole" was not "obvious at the time the invention was made to a person of ordinary skill in the art" Jimarez also fails to teach an encapsulation material that is disposed on the die active surface and the heat sink, as required in claim 1. Appellant respectfully asserts that the combination of Chen with Jimarez cannot be made without using the Appellant's disclosure as a guide.

At page 8 of the Final Office Action, the Final Office Action again admits that "Chen et al. fail to disclose the patterned adhesive layer 33." Appellant argued the impropriety of combining Chen with Jimarez, but the Final Office Action was silent in addressing this impropriety, rather, it merely repeated that it "combines the references of Chen et al. to Jimarez et al. because Jimarez et al. disclose a patterned thermally conductive adhesive layer" etc. (Final Office Action at pages 8 and 9). The Office has therefore failed to rebut Appellant's assertion of

the impropriety of combining Chen with Jimarez. Withdrawal of the rejections with respect to Chen in view of Jimarez is respectfully requested.

At page 9, the Final Office Action disagrees that "Jimarez et al. fail to teach an encapsulation material that is disposed both on the die active surface and the heat sink" But this is unmistakable in Jimarez. The Final Office Action next creates a straw man argument that the "second reference does not need to disclose all the limitations of the claimed invention." (Final Office Action at page 9). Appellant never did, and does not now dispute this assertion since it is immaterial to the issue of patentability. Rather, Appellant disputes the propriety of combining references. In response thereto, the Final Office Action merely states a conclusion of law regarding the "test for obviousness" (Office Action at page 9), without addressing Appellant's traversal in any way. Such a conclusory statement fails to meet the Office's burden of proof and rebuttal to the Appellant's traversal. "It is well settled that mere lawyer's arguments and conclusory statements, which are unsupported by factual evidence, are entitled to little probative value. In re Geisler, 43 USPQ2d 1362, 1365 (Fed. Cir. 1997); In re De Blauwe, 222 USPQ 191, 196 (Fed. Cir. 1984); In re Wood, 199 USPQ 137, 140 (CCPA 1978); In re Lindner, 173 USPQ 356, 358 (CCPA 1972)."

Withdrawal of the rejections is therefore respectfully requested.

Claim 29 was rejected under 35 USC § 103(a) as being unpatentable over Chen et al. (U.S. Patent No. 6,160,311) in view of Jimarez et al. (U.S. Patent No. 6,407,334) and further in view of Woodward et al. (U.S. Patent No. 4,731,700). The Appellant respectfully traverses the rejection and requests the Board to consider the following.

Appellant incorporates all the arguments above regarding the improper combination of Chen with Jimarez. The Office Action admits that "Chen et al. and Jimarez fail to disclose a microelectronic package core and wherein at least one die is disposed within at least one package

core opening." (Office Action at page 3). Woodward provides a radically different technology than either of Chen or Jimarez.

Appellant notes that structurally between Woodward's chip 16 and his heat sink 12 is a layer of molybdenum 12c that is not taught as an adhesive of any type. Rather, item 12c is simply referred to as a part of the heat sink 12.

Regarding the first criterion, because Woodward is solving wire routing problems by disposing some wiring 24 across the chip 16, and because Chen and Jimarez have significantly different technical challenges from each other and from Woodward, the combination of Chen and Jimarez with Woodward can only be reached by using the Appellant's disclosure as a guide.

Regarding the second criterion, there is no expectation of success to get a better pin-out for Chen by the application of Woodward, and there is no expectation of success to better ground the die in Woodward by the application of Jimarez.

Regarding the third criterion, merely that the Office Action assembles a mosaic of elements to assert a rejection, does not mean all the claims limitations are taught within the standard of unobviousness. The standard of patentability requires "the subject matter as a whole" was not "obvious at the time the invention was made to a person of ordinary skill in the art"

Appellant respectfully asserts that the combination of Chen and Jimarez with Woodward, creates a teaching that starts to drop out claimed elements, including a patterned thermally conductive adhesive. Appellant therefore respectfully asserts this combination cannot be made without using the Appellant's disclosure as a guide.

The *verbatim* repetition of rejection of claim 29 over Chen in view of Jimarez and further in view of Woodward in the Final Office Action provided no rebuttal to Appellant's traversal of these rejections that was proffered in the Amendment filed May 21, 2003. The Office has failed to meet its burden of going forward as well as its burden of rebuttal. Withdrawal of the rejection is respectfully requested.

Claims 1-4 were rejected under 35 USC § 103(a) as being unpatentable over Eichelberger (U.S. Patent No. 5,250,843) in view of Jimarez et al. (U.S. Patent No. 6,407,334). The Appellant respectfully traverses the rejection and requests the Board to consider the following.

The Office Action admits "Eichelberger fails to disclose a thin die attach material 16 is a patterned thermally conductive adhesive layer." (Office Action at page 4). Appellant notes Eichelberger's thin die attach material 16 is not patterned. Appellant further notes Eichelberger's encapsulant 18 is not disposed on the substrate 12, rather, it is disposed on the die attach material 16. Therefore, Eichelberger's structure is not, nor cannot be construed to teach or suggest what is claimed. The Office Action looks to Jimarez to remedy what is missing in Eichelberger. But Jimarez also fails to teach an encapsulation material that is disposed on the die active surface and the heat sink, as required in claim 1.

Regarding claim 1 and the first criterion, there is no teaching or suggestion in either Eichelberger or Jimarez to combine reference teachings to achieve the limits of claim 1. Eichelberger fails to teach patterned adhesive layer and an encapsulant that is disposed on both the heat sink and the die active surface. Jimarez relates to assuring electrical grounding within a package by coupling a chip 34 to a large body of electrically conductive adhesive 40. There is not teaching or suggestion in Eichelberger to look to Jimarez to find a patterned adhesive 44 in Jimarez.

Regarding claim 1 and the second criterion, there is no expectation of success to achieve the structure of Eichelberger, or the electrical grounding of Jimarez by their combination. This is because of their disparate endeavors in the technologies they teach. That Jimarez may have a patterned adhesive 44 can only be combined with the teachings of Eichelberger by using the Appellant's disclosure as a guide.

Regarding claim 1 and the third criterion, merely that the Office Action assembles a mosaic of elements to assert a rejection, does not mean all the claims limitations are taught within the standard of unobviousness. The standard of patentability requires "the subject matter

as a whole" was not "obvious at the time the invention was made to a person of ordinary skill in the art" Appellant respectfully asserts that the combination of Eichelberger with Jimarez cannot be made without using the Appellant's disclosure as a guide, and even if they could be combined properly, they do not teach all the claim elements as set forth above.

Regarding claim 2, although Eichelberger may teach a build-up layer etc., because claim 2 depends from claim 1, all the claim limitations are not taught as set forth above.

Regarding claim 3, although Eichelberger may teach a conductive trace etc., because claim 3 depends from claim 1, all the claim limitations are not taught as set forth above.

Regarding claim 4, although Eichelberger may teach a second conductive trace etc., because claim 4 depends from claim 1, all the claim limitations are not taught as set forth above.

At page 9 of the Final Office Action, the Final Office Action disputes the Appellant's assertion that "Eichelberger's encapsulant 18 is not disposed on the substrate 12, rather, it is disposed on the die attach material 16." (Final Office Action at page 9). The assertion that the "encapsulant 18 is disposed on the heat sink 12 through the die attach material 16" (Final Office Action at page 10) is a resort to semantic gymnastics that is disingenuous. The die attach material 16 is the only structure in Jimarez that is disposed on the substrate 12. The plain meaning of what is claimed in claim 1 can be ascertained by reading Appellant's disclosure, including the figures. Because Eichelberger in view of Jimarez does not teach the limitation of claim 1, "an encapsulation material disposed on said heat sink and said microelectronic die active surface" (claim 1), withdrawal of the rejections is therefore respectfully requested.

Claim 29 was rejected under 35 USC § 103(a) as being unpatentable over Eichelberger (U.S. Patent No. 5,250,843) in view of Jimarez et al. (U.S. Patent No. 6,407,334) and further in view of Woodward et al. (U.S. Patent No. 4,731,700). The Appellant respectfully traverses the rejection and requests the Board to consider the following.

The Office Action admits "Eichelberger and Jimarez et al. fail to disclose a microelectronic package core and wherein at least one die is disposed within at least one package core opening." (Office Action at page 5) Appellant notes Eichelberger's thin die attach material 16 is not patterned. Appellant further notes Eichelberger's encapsulant 18 is not disposed on the substrate 12, rather, it is disposed on the die attach material 16. Neither does Jimarez teach the limitation that the encapsulant is disposed on the heat sink and the die.

Appellant notes that structurally between Woodward's chip 16 and his heat sink 12 is a layer of molybdenum 12c that is not taught as an adhesive of any type. Rather, item 12c is simply referred to as a part of the heat sink 12.

Regarding the first criterion, because Woodward is solving wire routing problems by disposing some wiring 24 across the chip 16, and because Eichelberger and Jimarez have significantly different technical challenges from each other and from Woodward, the combination of Eichelberger and Jimarez with Woodward can only be reached by using the Appellant's disclosure as a guide.

Regarding the second criterion, there is no expectation of success to get a better pin-out for Eichelberger by the application of Woodward, and there is no expectation of success to better ground the die in Woodward by the application of Jimarez.

Regarding the third criterion, merely that the Office Action assembles a mosaic of elements to assert a rejection, does not mean all the claims limitations are taught within the standard of unobviousness. The standard of patentability requires "the subject matter as a whole" was not "obvious at the time the invention was made to a person of ordinary skill in the art"

Appellant respectfully asserts that the combination of Eichelberger and Jimarez with Woodward, creates a teaching that starts to drop out claimed elements, including a patterned thermally conductive adhesive. Appellant therefore respectfully asserts this combination cannot be made without using the Appellant's disclosure as a guide.

The *verbatim* repetition in the Final Office Action of rejection of claim 29 over Eichelberger in view of Jimarez and further in view of Woodward provided no rebuttal to Applicant's traversal of these rejections, proffered in the Amendment filed May 21, 2003. The Office has therefore failed to meet its burden of going forward as well as its burden of rebuttal. Withdrawal of the rejection is respectfully requested.

Claims 10 and 15-16 were rejected under 35 USC § 103(a) as being unpatentable over Shen (U.S. Patent No. 6,368,894) in view of Woodward et al. (U.S. Patent No. 4,731,700). The Appellant respectfully traverses the rejection and requests the Board to consider the following.

Regarding the combination of Shen and Woodward, Shen and Woodward cannot be combined because there is no location for Woodward's structure 14 between Shen's semiconductor chip 2 and second semiconductor chip 3. Therefore, the application of Woodward to Shen, destroys and renders impossible the structures taught by Shen. Any modification of Woodward's structure to be accommodated by Shen can only come by using the Appellants' disclosure as a guide because it is not found in the prior art.

Regarding claim 15, the Office Action states "Woodward et al. disclose a thickness of the ceramic member 14 is greater than a thickness of at least one die 16." (Office Action at page 6). This statement reinforces Appellant's assertion that the combination of Woodward with Shen destroys the teaching of Shen. First, using Woodward's ceramic 14 with a thickness greater than the chip 16 amounts to increasing the vertical profile of Shen. This defeats the low-profile geometry of Shen. Second, Woodward's ceramic 14 is disposed upon a heat sink 12, and there is no equivalent location to place any such structure upon a heat sink in Shen. Because the motivation for such a teaching or modification comes from Appellants' disclosure, and not from the cited references, withdrawal of the rejection is respectfully requested.

Regarding claim 16, the Office Action asserts Shen discloses the package core is a material selected from the group consisting of ceramics or metals (Office Action at page 7). As set forth above, the importation of Woodward into Shen, destroys and renders impossible the structures taught by Shen. Because the combination of Woodward with Shen does not amount to the limitations of claim 16, withdrawal of the rejection is respectfully requested.

The Final Office Action addresses the rejection of claims 10, 15, and 16 over Shen in view of Woodward. For most of page 10, the Office recites statements of law, which are conclusory as they do not address the applicant's traversals. The Final Office Action has therefore failed to meet its burden of rebuttal of Applicant's traversals. Finally, at page 11, the Final Office Action repeats, *verbatim*, the statement of rejection that appears at page 6 (which is the second *verbatim* repetition of the rejection that appeared at page 6 of the Office Action mailed on January 10, 2003). This repetition fails to meet the Office's burden of coming forward with evidence to rebut Applicant's traversal of these rejections. Further, the Office Final Action fails to meet its burden of rebuttal of Applicant's traversal of these rejections. Withdrawal of the rejections is therefore respectfully requested.

Claims 11-14 were rejected under 35 USC § 103(a) as being unpatentable over Shen (U.S. Patent No. 6,368,894) in view of Woodward et al. (U.S. Patent No. 4,731,700) and further in view of Eichelberger (U.S. Patent No. 5,250,843). The Appellant respectfully traverses the rejection and requests the Board to consider the following.

The Office Action admits "Shen and Woodward et al fail to disclose a build up layer disposed on an upper surface of the encapsulation material." (Office Action at page 7). Appellant incorporates all the arguments regarding the impropriety of combining Shen with Woodward. Appellant further notes that the combination of Shen with Eichelberger creates the same dilemma as the combination of Shen with Woodward.

Regarding the combination of Shen and Eichelberger, Shen and Eichelberger cannot be combined because there is no location for Eichelberger's structures 18, 20, 24, and 26 between Shen's semiconductor chip 2 and second semiconductor chip 3. Therefore, the application of Eichelberger to Shen, destroys and renders impossible the structures taught by Shen, and as set forth above, Woodward also destroys the structure of Shen. Any modification of Eichelberger's structure to be accommodated by Shen can only come by using the Appellants' disclosure as a guide because it is not found in the prior art.

Regarding claim 11, although the Office Action asserts Eichelberger discloses the build up layer, as set forth above the importation of Eichelberger into Shen, destroys and renders impossible the structures taught by Shen, and as set forth above, Woodward also destroys the structure of Shen. Because the combination of Eichelberger with Shen and Woodward does not amount to the limitations of claim 11, withdrawal of the rejection is respectfully requested.

Regarding claim 12, although the Office Action asserts Eichelberger discloses the build up layer and at least "on (sic) conductive trace 20" (Office Action at page 7), as set forth above the importation of Eichelberger into Shen, destroys and renders impossible the structures taught by Shen, and as set forth above, Woodward also destroys the structure of Shen. Because the combination of Eichelberger with Shen and Woodward does not amount to the limitations of claim 12, withdrawal of the rejection is respectfully requested.

Regarding claim 13, although the Office Action asserts Eichelberger further includes "at least one dielectric layer 24" (Office Action at page 7), as set forth above the importation of Eichelberger into Shen, destroys and renders impossible the structures taught by Shen, and as set forth above, Woodward also destroys the structure of Shen. Because the combination of Eichelberger with Shen and Woodward does not amount to the limitations of claim 13, withdrawal of the rejection is respectfully requested.

Regarding claim 14, although the Office Action asserts Shen discloses the encapsulation (34 and 24) covers the package core first surface, as set forth above the importation of

Eichelberger into Shen, destroys and renders impossible the structures taught by Shen, and as set forth above, Woodward also destroys the structure of Shen. Because the combination of Eichelberger with Shen and Woodward does not amount to the limitations of claim 14, withdrawal of the rejection is respectfully requested.

In the Final Office Action, a *verbatim* repetition of rejection appears, of claims 11-14 over Shen in view of Woodward and further in view of Eichelberger. Because there is no rebuttal to Applicant's traversal of these rejections, proffered in the Amendment filed May 21, 2003, the Office has failed to meet its burden of going forward as well as its burden of rebuttal. Withdrawal of the rejections is respectfully requested.

Claim 17 was rejected under 35 USC § 103(a) as being unpatentable over Shen (U.S. Patent No. 6,368,894) in view of Woodward et al. (U.S. Patent No. 4,731,700) and further in view of Jimarez et al. (U.S. Patent No. 6,407,334). The Appellant respectfully traverses the rejection and requests the Board to consider the following.

The Office Action admits "Shen and Woodward et al. fail to disclose a patterned thermally conductive adhesive layer." (Office Action at page 8). Appellant respectfully asserts the combination of Shen with Woodward cannot be made. The board 10 and solder ball connector 48 in Jimarez, destroys the structure of Shen. The board 10 and solder ball connector 48 in Jimarez are for mounting against a printed wiring board (Jimarez at column 3. lines 34-39), not another chip as in Shen.

Appellant incorporates all the arguments regarding the impropriety of combining Jimarez with Woodward as set forth above, and therefore respectfully requests withdrawal of the rejection.

Regarding the combination of Jimarez with Shen, Appellant notes that there is no teaching or suggestion in Shen to include a patterned adhesive, or any adhesive for that matter, between Shen's metal heat dissipating plates 23 and 33, and their respective chips 2 and 3. The

combination of Shen with Jimarez can only be achieved by using Appellant's disclosure as a guide.

In the Final Office Action, a *verbatim* repetition of rejection appears, of claim 17 over Shen in view of Woodward and further in view of Jimarez. Because there is no rebuttal to Applicant's traversal of this rejection, proffered in the Amendment filed May 21, 2003, the Office has failed to meet its burden of going forward as well as its burden of rebuttal. Withdrawal of the rejection is respectfully requested.

9. SUMMARY

Because the specific limitations in the rejected claims are not described in the cited references relied on in the rejection, these limitations render the claims unobvious over the cited references. Appellant respectfully requests that the Board overturn the Examiner's rejection.

The cited references taken as a whole do not suggest the claimed subject matter. For the foregoing reasons, Appellant respectfully submits that the rejection of the claims on appeal was erroneous. Appellant earnestly requests the Board to overturn the Examiner's final rejections.

Decision Regarding Oral Hearing Delayed

As permitted by the provision of 37 CFR §1.194, Appellant will delay a final decision on oral argument until after review of the Examiner's Answer.

APPELLANTS' BRIEF ON APPEAL

Serial Number: 09/733289

Filing Date: December 08, 2000

Title: Microelectronic Package Having an Integrated Heat Sink and Build-Up Layers

Assignee: Intel Corporation

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Dkt: 884.798US1 (INTEL)

Conclusion

Appellant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested.

The Commissioner is authorized to charge Deposit Account 19-0743 in the amount of \$330.00 to cover the fee for filing this Appeal Brief. If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

XIAO-CHUN MU ET AL.

By their Representatives,

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Date June 22, 2004 By Ann M. McCrackin
Ann M. McCrackin
Reg. No. 42,858

CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Mail Stop Appeal Brief - Patents, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 22nd day of June, 2004.

ANNE M. RICHARDS

Name

Signature

APPENDIX I

The Claims on Appeal

1. A microelectronic package, comprising:
a heat sink;
at least one microelectronic die having an active surface and a back surface, said at least one microelectronic die back surface adjacent to said heat sink;
a patterned thermally conductive adhesive layer disposed between said at least one microelectronic die and said heat sink; and
an encapsulation material disposed on said heat sink and said microelectronic die active surface.
2. The microelectronic package of claim 1, further including a build-up layer disposed on an upper surface of said encapsulation material.
3. The microelectronic package of claim 2, wherein said build-up layer comprises at least one conductive trace disposed on said encapsulation material upper surface, wherein a portion of said at least one conductive trace extending through said encapsulation material to contact said at least one microelectronic die active surface.
4. The microelectronic package of claim 3, wherein said build-up layer further includes at least one dielectric layer disposed on at least a portion of the encapsulation material upper surface and said at least one conductive trace, and at least one second conductive trace extending through said at least one dielectric layer to contact said at least one conductive trace.

Claims 5-9 (Canceled)

10. A microelectronic package, comprising:
a heat sink;
a microelectronic package core having a first surface and an opposing second surface,
said microelectronic package core having at least one opening defined therein extending from
said microelectronic package core first surface to said microelectronic package core second
surface, where said microelectronic package core second surface abuts said heat sink;
at least one microelectronic die disposed within said at least one microelectronic package
core opening and adjacent said heat sink, said at least one microelectronic die having an active
surface; and
an encapsulation material disposed on said microelectronic die and in portions of at least
one microelectronic package core opening.
11. The microelectronic package of claim 10, further including a build-up layer disposed on
an upper surface of said encapsulation material.
12. The microelectronic package of claim 11, wherein said build-up layer comprises at least
one conductive trace disposed on said encapsulation material upper surface, wherein a portion of
said at least one conductive trace extends through said encapsulation material to contact said at
least one microelectronic die active surface.
13. The microelectronic package of claim 12, wherein said build-up layer further includes at
least one dielectric layer disposed on at least a portion of the encapsulation material upper
surface and said at least one conductive trace, and at least one second conductive trace extending
through said at least one dielectric layer to contact said at least one conductive trace.
14. The microelectronic package of claim 11, wherein said encapsulation material covers said
microelectronic package core first surface.

15. The microelectronic package of claim 10, wherein a thickness of said microelectronic package core is greater than a thickness of said at least one microelectronic die.

16. The microelectronic package of claim 10, wherein said microelectronic package core is a material selected from the group consisting of bismaleimide triazine resin based material, an FR4 material, polyimides, ceramics, and metals.

17. The microelectronic package of claim 10, further including a thermally conductive adhesive layer disposed between said at least one microelectronic die and said heat sink.

Claims 18-28 (Canceled)

29. The microelectronic package of claim 1, further including:

a microelectronic package core having a first surface and an opposing second surface, said microelectronic package core having at least one opening defined therein extending from said microelectronic package core first surface to said microelectronic package core second surface, where said microelectronic package core second surface abuts said heat sink; and

wherein the at least one microelectronic die is disposed within said at least one microelectronic package core opening and adjacent said heat sink, said at least one microelectronic die having an active surface, and a patterned thermally conductive adhesive layer disposed between said at least one microelectronic die and said heat sink.